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personal followers were unpunishable. Three *causes célèbres* of the period should be mentioned. The first was the murder in Mosul of Shaykh Sa'id Barzinji of Sulaymaniya on the first day of 1909. It was an act of defiant violence against a figure of the greatest eminence; and the aftermath of the murder convulsed the Sanjaq of Sulaymaniya. The second case was the murder of Farid Beg, General and ex-Mutaṣarrif of the Muntafiq, in Baṣra bazaar in June 1913. The third was the murder of Aḥmad Bey, Commandant of Gendarmerie in Baghdad, in August 1913.

In the urban services there was fitful progress. New buildings of some pretension appeared towards South Gate in Baghdad, in the outskirts of Karbalā and Mosul, at the 'Ashar suburb of Baṣra. The Tigris-side towns, and some of the Kurdish, developed fast. Kirkuk and Arbil doubled in size from 1890 to 1914. Ḥalabja under its Jāf dynasty was further embellished. Military hospitals and a very few municipal dispensaries made their appearance. The Jewish hospital of Mir Elias was opened in 1910, a new building for the C.M.S. in Baghdad was completed in 1913, while their Mosul hospital shut and reopened seasonally. But medical arrangements in general remained primitive, quarantine was still largely a bribe-extracting farce, and no efforts were made seriously to combat disease or malnutrition. Street lighting improved, hotels appeared in the larger towns under Armenian or Chaldean enterprise, a cinema was opened in Baghdad in 1911.

Cross-river steam-ferries, public gardens, wider streets, a zoo, improved steel bridges, tramways, electric lighting—all these had their place in the plans of incoming Walis and Mutaṣarrifs, and in fact some success in municipal improvement—in streets, gardens, offices, and amenities—emerged from this period, though the schemes even of a Nadhim Pasha remained nine-tenths abortive. The Kufa–Najf tramway was completed during this period. A company was formed in London in 1912 by a leading Baghdadi, Maḥmud Shahbandar, for electric tramways and lighting.

In trade and commerce there was some advance. The staple exports of the territory still varied annually according to the harvest and the level of inland security. The quantities of dates, grain, seeds, gall-nuts, gums, animals and animal products, and the transit items from Persia showed slight increases. The tonnage and value of imports had been more than doubled since 1900. The increase reflected largely the needs of railway construction, partly the increased use of irrigation and other machinery and paraffin, partly a perceptibly rising standard of urban life with its greater demands for cotton cloth, sugar, tea, and matches. The moderate inroads of Russia and Germany into the 'Iraq markets are elsewhere mentioned. The great bulk of import and export trade was

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172 founded in a single room in 1924, was more spaciously housed two years later. A suitable Antiquities Law was passed. This, and all Antiquities affairs, were handled at the King's request by Miss Bell as Honorary Director until her death, when she was succeeded in that capacity by Cooke of the Awqaf.

744 The Health service, under an 'Iraqi Director-General since 1922 with Dr. T. J. Hallinan as Inspector-General, developed slowly but soundly. It maintained its hospitals in main centres, its town dispensaries, its quarantine and pilgrim services, its specialist institutes for opthalmic, X-ray, pathological, chemical, and anti-rabies work, and its training courses in pharmacy and nursing. The twenty-five 'Iraqi and Lebanese doctors employed in 1921 increased to over eighty within ten years; British doctors in the same decade fell from forty to twenty, British nurses from twenty-four to eleven, and Indian (subordinate) staff from over two hundred to four. Out-patient attendances rose from 715,000 in 1921 to 1,600,000 in 1926, and were to be double that figure in 1930. The 'Iraq Railways had their separate medical service. The Jewish hospital of Mir Elias in Baghdad continued independent. A severe cholera epidemic was well handled in 1923.

619 721 166 622 In the tribal world something of a new spirit now manifest could well raise hopes for a future of peace and settlement. Although the economic background of tribal unrest—uncertainty of land rights, the claims of absentee title-holders, uncontrolled irrigation, insecurity, and unjustly small crop-shares—was all unchanged, and although to many a shaykh local autarky or anarchy was still the ideal, yet there were forces also on the side of order and progress. Such police or punitive action as Government was forced to take in the period 1922 to 1926 was invariably effective. Age-long feuds, such as that of the 'Ana and Rawa folk, were composed; the toll-taking and raiding of the Shammar diminished. The marsh area of Chuba'ish was happily transformed by the removal of its potentate, Salim al-Khayyun: disobedience was chastised in 'Afak and Samawa areas, and elsewhere a score of tribal offences were punished. The opening of roads in the mid-Euphrates marsh-intersected districts, with new police posts soundly constructed and regular patrols of mounted or motorized police, had good effect. And Government tribal policy had itself been modified. An element in the 1920 insurrection was held to be the grant, under British policy, of excessive authority to the shaykhs; an 'Iraqi governing class substantially urban and anti-tribal was unlikely to persist in this attitude. To penetrate, break up, weaken, and thus 'civilize' the tribe became and remained the policy of the 'Iraq Government, as it had been of the Ottoman. Even the tribal leaders who sat in Parliament or joined in party

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European dress was
291 ever more generally adopted in the larger towns, and spread significantly to urbanized tribesmen. Among upper-class women, though the veil was still almost universal among Muslims, Western
556 clothing was worn increasingly. The desire for material progress was reflected in the eagerness of the rich to acquire motor-cars, gramophones, and the toys and amenities of Europe; but inability to pay for these gave rise to demands for limitless credit.

466 Interest at the International Labour Office in conditions among 'Iraq's industrial workers led to some answering efforts to produce suitable legislation; but the smallness of this class in an unindustrialized country made European criteria and standards largely inapplicable. The first seeds were sown, however, of a social interest in labour matters.

744 To the whole community and to urban society in particular with its still prevalent poverty and low purchasing power the Government's Health and Education services contributed valuably. The former improved its quarantine and pilgrim services, multiplied its countryside dispensaries, improved its specialist institutes, and dealt well with the cholera epidemics of 1927 and 1931. It was significant that out-patient attendances, less than 750,000 in 1921, had more than doubled by 1926 and quadrupled by 1930. In response to foreign purchasers' outcry, the Health Department imposed measures of cleanliness in the date industry. In 1927 it founded the Royal Medical College; this, a medical school of good standards, took at once a high place in 'Iraq's higher and professional education. A School of Pharmacy had existed since 1922. The Government adhered during these years to a number of international conventions on medical as on many other matters.

871 The 'Iraqi schools seemed to foreign observers at this period—and indeed at others—to lack something of the best spirit of education. There was criticism of lax discipline, uncritical self-flattery, a worship of modernity and materialism; politics pervaded too many of the schools, always in the form of a crude xenophobia eager for street demonstrations. Nevertheless, an educational system grew and multiplied its facilities, fought for budget allotments, developed an Inspectorate, codified its Regulations. A Hygiene Directorate was formed in the Education Ministry, later
[562] greatly to develop. The year 1930 saw the first Government secondary schools for girls; the days of Muslim hesitation over female education were almost over. For boys the secondary period was prolonged from four to five years, three 'intermediate' and two 'senior'. The dispatch of students for higher education abroad grew commoner. Technical education remained unpopular: it did not lead quickly enough to the goal chiefly envisaged, a Govern-

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744 The Health Department, criticized for an unprecedented malaria
361 epidemic in Baghdad in 1936, seemed to call for reform and for a
631 broader activity which should include the rural and backward
466 areas as well as the towns. The period was one of many municipal
554 improvements and considerable building and town-planning. Electric power and light, widened streets, a modern water-supply, improved conservancy, municipal gardens—these were now features of all but the humblest *baladiyas*. It was, indeed, the policy of Yasin Pasha to encourage the devolution of the local services into municipal hands, and funds were provided accordingly; later Prime Ministers followed his example. The passage into law of a Labour Code in 1936 reflected pressure on Government to insist, at least ostensibly, on something of modern standards in the treatment of industrial workers; but the Code had for the moment little practical effect. A law of 1935 prohibiting non-'Iraqis from practising certain trades seemed to threaten domiciled Indians, and was suitably amended and scarcely enforced. The 1936 law abolishing, under severe penalties, the use of Turkish titles—Pasha, Bey, and Effendi—in favour of the simple Arabic 'Sayid'—Master, or Mr.—was widely ignored among the general public and by Europeans, as indeed by Ministers themselves and by others in authority.

671 The application of the National Service Law, passed in 1934,
184 devolved upon the Hashimi Ministry and could not but be imper-
702 fect. Wide tribal areas were in practice exempt; the accessible and the weak were exploited. Armed resistance, as has been seen, was not infrequent, desertion was common, and the payment of a low exemption fee to escape service was habitual. The machinery of recruitment was inefficient, census lists inaccurate, and the resulting military forces habitually below their authorized strength.
701 Nevertheless, the 'Iraq Army, with its British Military Mission constantly in support, improved its training and equipment and its housing facilities, and was highly favoured by King Ghazi. Increasing from some 11,500 men in 1933 to double that number by the end of 1936, it was now organized in two divisions and, territorially, into four districts. Its armament and capacity were sufficient for internal purposes, its corps of officers good in the lower, indifferent or poor in the higher ranks. Unused on any operations in 1934—a unique event—the Army was busy with tribal suppression in the two years following, and was shortly to
707 emerge as the arbiter of 'Iraq's political destinies. The Royal 'Iraq Air Force grew from a few machines to three formed squadrons.
701 The small surviving force of 'Iraq Levies, some 1,500 strong, was now specialized to aerodrome-guard duties under R.A.F. Command, and the Assyrian monopoly therein had been broken

by the recruitment of Kurdish and Arab companies.

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exchanged between Nuri Pasha and Mr. Churchill: but no important practical results could be expected from this move, which at best would serve to secure for the country a better place at the Peace Conference, and meanwhile to establish its leadership in the Arab world. Public opinion, which showed neither enthusiasm nor dismay at the declaration of war, and felt little resulting sense of obligation, was unlikely to support its Prime Minister to the extent of sending 'Iraqi troops abroad; nor was the Army yet capable of foreign operations. This condition improved gradually with the Allied successes in North Africa, visits were organized for 'Iraqi officers to the Libyan battlefields, and the British Mission under Major-General G. Bromilow, successor to Major-General Waterhouse, did what it could to restore Army morale and comradeship. Meanwhile, in default of fighting, 'Iraq's contribution to the Allied war effort was not negligible; camp sites and lands were offered without rent, buildings were surrendered under requisition without demur. Economic controls were introduced under British advice; the management of river traffic and the Port was shared or surrendered, and the widest military use of the railway system accepted. Priority was given to Army man-power requirements, the telegraph and telephone system placed at military disposal, and grain supplies provided.

Difficulties of procurement, and the economic unbalance which was afflicting 'Iraq at this period, prevented the pursuit of such major projects as had been intended. Nevertheless, urban development could proceed—not least in the capital—suburbs could be planned and partly built, and a beginning could be made with working-class dwellings to replace insanitary labyrinths of mud and petrol-tin hovels: indeed, the war years witnessed great changes in the aspect of the towns. Municipal institutions themselves were multiplying and developing; and, small as were the resources of most corporations, the total of their revenues tripled during these five years. By a pleasing gesture the Lord Mayor of London presented, with suitable fraternal messages, a chain of office to the Amin al-'Asima. The Health services continued to develop. Doctors working for the Administration and private practitioners increased in numbers, recruited mainly from the Royal Medical College in Baghdad. British specialists, who had served the country and their science now for twenty years, still played their invaluable part. In Education also the period was far from one of stagnation. A revised Public Education Law was passed; primary, intermediate, and secondary schools—boys, girls, and mixed—all rose in numbers, and many new private schools were founded. Pupils sent for higher studies abroad were few during the war, but the flow recommenced strongly in 1944. A

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the American School of Oriental Research founded in 1923 and the British School founded in 1929 maintained headquarters in Baghdad, and both published the results of their researches.

In the field of Public Health the Government services had achieved much, but not the impossible. They had faced an immense field to cover and to conquer, had started from nothing, and had been always restricted by lack of funds and trained officials; and meanwhile, inevitably, the disease- or weakness-producing factors in the territory, and the apathy and conservatism of its people, continued. The problem of general malnutrition and resulting lack of physical vigour was, in fact, the problem of poverty: the cure, still distant, lay as much or more in increased wealth as in increased enlightenment; and the same was true, in spite of active and multiplying maternity and child-welfare clinics, of an infant death-rate still tragically high. Little, save increasingly comprehensive and practical study, had yet been done to combat the curse of hookworm, malaria, or bilharzia; a comprehensive effort against these diseases and against tuberculosis, eye-disease, and the typhoid group must call insistently for more time, more funds, and more specialized staff. Steps taken against epidemic disease had been successful; plague and cholera had scarcely appeared for a quarter-century, and smallpox was well handled with full modern resources. Urban sanitation had been improved, sewage schemes adopted, and sanitary inspector training developed; but conditions in this respect over most of the territory remained wholly primitive, and the majority of 'Iraqi doctors were little interested in public health administration. The country at large was served by some eighty hospitals, of which three-quarters were general and a quarter specialized for fevers, mental and venereal diseases, leprosy (at 'Amara), children's and chest and eye diseases; a quarter of the whole were in Baghdad. Non-governmental hospitals were those of the oil companies, foreign missions, and the minority communities. The Jewish Mir Elias Hospital was still open, for patients of all creeds; all other Jewish hospitals and dispensaries had been closed. The Railways, the Port, the Police, and the Army maintained their separate Medical services. The supply of doctors, thanks to the Royal Medical College, had much improved since the thirties, but some reliance on foreigners was still necessary; some thirty of these were so employed in 1951 and recruitment of more was in progress. Registered practitioners in all numbered some 300 in 1945, 420 in 1949. The reluctance of 'Iraqi doctors to serve in the remoter regions—or, indeed, elsewhere than in Baghdad—was still an embarrassment. Nevertheless, the busy and valued hospitals and dispensaries maintained in all parts of 'Iraq were playing a major stabilizing as well as a

658 238 students, to fifteen with 1863 students. Nor has the increase
871 in schools been attended by a decrease in the quantity or
[875] quality of the teachers, although they are admittedly still inadequate in numbers and in training. The return of 'Iraqī students sent abroad at the expense of the Government in lieu of setting up its own Higher Educational Institutions has brought fresh blood, progressive ideas and new standards to Education to an extent not equalled by any other Ministry. Careful efforts have also been made, particularly in recent years, to adapt Western methods to 'Iraq instead of blindly adopting them. In this respect, the educational system in vogue in present-day Turkey has been looked to as furnishing a model.

871 Notwithstanding these praiseworthy achievements, concern has been expressed both by 'Iraqīs and by others lest various tendencies, now observable in the educational system, mar the work of the Ministry. Such trends seem to be: the extension of the number of schools without maintaining their grade or the standard of work required by them; the failure of the Ministry to dissociate itself entirely from political struggles and controversies; and the acquisition by students of the view that education is vocational rather than cultural in aim and that government positions should be the reward of their school certificates. On the ability of the educational system to free itself from these handicaps, either by the wise direction of educational affairs on the part of those in authority or by the growth of a new attitude on the part of the people themselves, will depend much of the continued progress of 'Iraq.

744 In other fields, a health service has been in existence since
759 the British Occupation, a Medical School has been created at Baghdad, plague and cholera checked and sanitary regulations for the corpse traffic to the Holy Cities imposed. On the other hand, the Medical School has been unable to provide sufficient highly trained graduates with a willingness to take posts in out-
[758] lying districts. Medical centres are unable to reach but a small
164 portion of the total population. Malaria, tuberculosis and eye dis-

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therefore vitally important that more attention be devoted in the future to the preventive aspects of public health work.

Prevention of Disease

Many measures could be taken to strengthen the preventive aspect of public health work. Doctors and nurses must, above all, be imbued with its importance for they have countless opportunities to impress on their patients the need for proper hygiene and sanitation. Thus social medicine, involving the study of the environmental factors bearing on health and of appropriate measures for the prevention of disease, should be taught as part of the qualifying course in the medical school at Baghdad. Far more emphasis also needs to be placed on the teaching of hygiene in elementary and secondary schools. Children should be taught not only good personal habits, but also the importance of sanitation in and around the home. Special classes might be given in the prevention of the main endemic diseases, by the school medical officer whenever possible. Health education must likewise be given an important place in the curriculum of teachers' training colleges and special courses in the prevention of diseases associated with irrigation and cultivation should be provided in the School of Agriculture and the School of Engineering. Hospitals should be an object lesson in hygiene and every effort made to impress on patients the importance of personal and domestic hygiene. The interest of adults in public health can be stimulated by visual education and by organizing "health weeks", the first of which was held in Diwaniya with conspicuous success during the Mission's stay. The army and police have an excellent opportunity to teach habits conducive to good health. Prospective farmers for new settlement projects should be medically examined to restrict, as far as possible, the introduction of endemic diseases into these settlements. To prevent water pollution it would be desirable to locate villages in such settlements away from irrigation canals wherever possible.

The Mission strongly recommends that the number of rural dispensaries, which is now over 400, be gradually increased and that they be equipped to serve as public health centers. Such centers would be simple in function, aimed primarily at providing elementary medical and health assistance to as many people as possi-

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ble. As conditions permit, the scope of their services could be expanded. At the present stage it will usually be sufficient to have a specially trained medical assistant rather than a doctor in charge. At present there is no separate cadre of medical assistants. It is therefore suggested that the existing School for Health Officials be converted into a training school for such assistants or aides. The medical assistant in charge of a dispensary will need to consider himself as the village sanitation officer and enlist the help of the village elder in organizing a cooperative effort to keep the village clean. He will also need the assistance of a village midwife and, at a later stage, of a public health nurse. The traditional midwife, if properly trained, could have great influence in improving the standards of personal and domestic hygiene, in combatting infant mortality and giving simple advice on the care of infants. Such midwives, when drawn from the ranks of the people whom they will serve, will have a ready entry into homes and will be able to speak in terms which will be readily understood. It is therefore recommended that a school for training such midwives, recruited from the villages, be established. A similar school should be set up for town midwives. It would be desirable to have three foreign midwives appointed to direct this training program.

In the cities a considerable improvement in sanitation could be effected through the creation of a sanitary corps. Such a corps should be charged with house-to-house inspection to detect health nuisances and prevent fly and mosquito breeding, with the inspection of eating-houses, foodstuffs and food handlers, and with the improvement of environmental hygiene in general. A foreign public health or sanitary engineer would be required to organize this service and establish the facilities and courses for training appropriate numbers of sanitary overseers and sanitary inspectors who, in turn, would impart the necessary instruction to the house-to-house inspectors.

The prevention of hookworm, malaria and bilharzia warrants special attention. These diseases are widely prevalent and through their general debilitating effects materially lower productivity. The incidence of hookworm would be reduced by improvements in sewage disposal, the closing of open drains, provision of suitable latrines and the wearing of shoes. Bilharzia, which is transmitted

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by a snail living in irrigation canals, can be combatted by elimination of stagnant, polluted water in which the snail thrives and by treating canals twice yearly with copper sulphate. DDT spraying and the elimination of stagnant water assist in the reduction of malaria. In order to combat both malaria and bilharzia, major irrigation canals should be designed so as to maintain a rate of water flow no less than three miles per hour, and minor distributory canals so as to insure rapid drying-out after use. It is important that one complete "dry-out" per week be enforced in every section under irrigated cultivation.

Knowledge of such methods of combatting disease is already available in Iraq. What is needed is wider dissemination of the knowledge and a vigorous campaign to give it effect. The Endemic Diseases Institute in Iraq has done much useful work in this field but it has been handicapped by insufficient transport, supplies and technical personnel. In the future there will be no justification for denying the Institute adequate funds for its work. It would be well to organize special campaigns in those provinces or districts where the incidence of a particular endemic disease has been especially high. Such a campaign would involve a simultaneous effort to treat the people already afflicted in the locality and to teach local officials and the local inhabitants in general the appropriate preventive measures. Mobile dispensaries and mobile vans equipped to show educational films would be especially useful for this purpose.

Curative Services

On the curative side, principal emphasis must first be placed on the improvement of existing hospitals and an expansion in the nursing service. In its five-year program the Development Board has allotted ID 3,800,000 for medical service buildings. The Mission believes that a large part of this sum should be used to modernize, extend or replace existing hospitals and improve their facilities for diagnosis and treatment rather than to construct additional hospitals. In the monograph on public health the Mission has listed the most urgent projects of this kind which it suggests should be undertaken in adition to those for which provision was made in the first annual budget of the Development Board. While the number

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759 ence has already been made to the importance of special training for medical assistants who will generally be in charge of village dispensaries.

278 Many people will continue to be far removed from hospitals, dispensaries and pharmacies. For these it is important to make available such simple "household remedies" as anti-malarial drugs, aspirin, tincture of iodine, DDT powder and Epsom salts. It is suggested that the government make arrangements to supply through village shops such drugs in suitable packets carrying simple directions for use. The general availability of these remedies at a reasonable price will also help to reduce the large number of visits to dispensaries for comparatively trivial ailments.

Organisation of Public Health Administration

744 647 The measures outlined above require a number of changes in the administration of the public health program. The present organization, which is the responsibility of the Ministry of Social Affairs, does not lend itself to an effective attack on the problem of disease prevention. Like most of the other central administrations, it suffers from excessive centralization. There is too little contact with other ministries whose activities are of importance to public health. The Mission suggests that a public health administrator, together with an epidemiologist and a sanitary expert, be recruited abroad to advise the Minister on the organization and further development of the health services. The epidemiologist would concentrate on the principal endemic diseases and the sanitary expert would advise on measures to improve sanitation and environmental hygiene. While a detailed reorganization should await their advice, it would seem best to group health services according to two main divisions, one concerned with the curative, the other with the preventive services.

In the future the reorganized health services will need to work much more closely with the departments concerned with irrigation and agriculture and, on the problem of health education, with the Ministry of Education. In carrying out a much needed decentralization considerable responsibility must, above all, be placed on the chief medical officer in every province. This officer, who now also carries on a private practice, should be given more adequate pay so

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that he can devote his full time to public health work. It will also be important to provide both the provincial and district medical officers with sufficient transportation to enable them to discharge their duties.

VI. Community Planning and Facilities

In the past, communities have unavoidably grown up rather haphazardly. The older parts of the cities are characterized by great congestion, narrow and winding streets, open drains and generally unsanitary living conditions. Livestock are frequently kept in buildings and backyards of major cities. Overcrowding has been greatly aggravated by the influx of people from the land seeking to escape the hard conditions of life in the rural areas and to find opportunities for employment in the cities. Many of these have simply squatted on vacant lots and on the outskirts of cities; they live in primitive, poorly constructed mud and mat huts under conditions of great squalor and without sanitary facilities. Baghdad has about 60,000 of these so-called *sarifa* dwellers and Basra probably no less than 20,000. In each case most of them have immigrated from the province of Amara where problems of land tenure and the silting and salting of land have made conditions of life unusually difficult. Sewage systems are lacking in all of the cities.

Villages are generally clusters of mud houses where, in many cases, men and livestock are not segregated. They have usually grown up around wells or along streams and irrigation canals under conditions where water pollution becomes inevitable. For the most part, safe water supplies are not available. The current flight from the land cannot be arrested as long as the ordinary village lacks the most elementary facilities of sanitation, medical aid, clean drinking water, and schooling, and generally offers little attraction to the person who wants to improve his lot and enjoy a reasonably comfortable life.

Dwellings of mud and mats are not of themselves undesirable. They have the advantage of cheapness and, when properly constructed, are well adapted to climatic conditions in Iraq. Often,

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654x 433 pumps. In other respects industrial development would be geared to supply the growing demand for consumers goods, such as shoes, textiles and utensils, and for construction materials, such as cement, arising out of the development program itself.

654x 439 Rising agricultural and industrial output will necessitate a corresponding increase in transport capacity. Here the development of road transport and the replacement of wornout track, locomotives and rolling stock will be the principal tasks of the future.

654x 871 744 Since the relationship of health and education to production may appear more indirect, there is danger that these two subjects will be neglected in the emphasis on greater national output. Basically, however, it is the productivity of manpower which must be raised, and this can be achieved only if measures are taken to make people better educated and to free them from debilitating disease. In the future the public health effort must concentrate on the prevention of disease through such measures as increasing the number of village dispensaries, the training of midwives, the organization of a corps of sanitarians, elimination of stagnant and polluted water, provision of safe water supplies and sewage disposal, slum clearance and better housing. Community planning should focus largely on such improvements as will contribute to better public health. A great broadening of the educational effort is needed in the future to teach people how to cope more effectively with the problems of everyday living. To this end, compulsory primary education should be gradually introduced over the next 15 years and a vigorous campaign for the education of adults should be launched. At the same time, however, it is vitally important to adapt education to the practical needs of the people, helping them to improve their health and their methods of work.

654x The program which the Mission has outlined in this report is undoubtedly ambitious. It requires a rate of progress unprecedented for a country which for many centuries remained virtually static and which over recent decades has developed at a relatively slow pace. There is no assurance that the program can be carried out over the next five years. Yet the Mission has thought it important to set up targets, even ambitious targets, toward which the country can strive. If successful, the program will bring about a

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Dairy Products

The larger towns receive their milk and milk products from cows, buffalo, sheep and goats which are kept in backyards in town or on nearby farms and settlements. The dairy cattle among them are usually of mixed or nondescript breed. While they are surprisingly well fed, their housing and the methods of milking and processing the milk are extremely primitive. The majority of municipalities appear to have sufficient legislation to ensure clean milk production, but enforcement is poor and the livestock owner is not educated to the necessity for taking more care with the production of his commodity. Baghdad, for example, has regulations to remove livestock out of the city and locate them outside of the city boundaries. It has provided livestock settlements for the milking buffalo complete with walled paddocks, running water and feeding stalls, but unfortunately with no accommodation or living quarters for the workers. Despite these facilities many livestock owners continue to keep their animals in the poorer quarter of the city, and no attempt is made by the government to demonstrate clean milk production in these settlements.

The government has taken a step in the right direction in [744]. installing a small milk pasteurizing plant in Baghdad (100-gallon flash pasteurizer), but the only milk passing through the plant is some 200-300 liters a day from the Abu Ghuraib agricultural station. Unfortunately many Baghdad residents do not even know of its existence. Some government officials have urged a larger pasteurizing plant even though the present plant is daily running considerably below capacity. The cleanliness of existing milk supplies must first be improved and producers persuaded to use the existing plant.

Another unfortunate feature of the present "backyard" herds is the fact that many dry cows and calves are sent to slaughter and only the milk producing animal is retained. Each year the dairy industry loses a great number of potentially good milk-producing animals in this way.

The following recommendations for the amelioration of the situation in Baghdad are put forward with the expectation that, if they are successfully applied there, they can be extended also to the other major cities:

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ANNEX F

PUBLIC HEALTH

I. Introduction

Extent of Progress Made in Public Health

In the past 30 years health services in Iraq have improved considerably. In 1918 the country had only one hospital, contrasted with the present 89 hospitals (4,812 in-patient beds or one bed per 1,000 people) and 448 dispensaries. Control measures including the use of vaccines, particularly for smallpox, have cut down the incidence of epidemics during the last few years. Cholera has not occurred since 1931 and the plague not since 1935. Smallpox and louse-borne typhus also seem to be under control. An Institute of Endemic Diseases has been set up with headquarters in Baghdad. Steps have already been taken to control malaria and a good deal of information is being assembled on schistosomiasis (bilharzia) and ankylostomiasis. Nevertheless, the main endemic diseases—malaria, schistosomiasis, trachoma, and ankylostomiasis—are still very common.

In 1949 there were 797 doctors practicing in Iraq, of whom 419 or 53 percent were in Baghdad. There were about 387 government pharmacies and 252 pharmacists working in private pharmacies in the larger towns.

The doctors are supplemented by 265 health officials, originally trained primarily to staff village dispensaries, and 400 nurses and 659 dressers (male hospital attendants), about one to every four or five hospital beds. There are also private nurses, midwives and dressers, and 130 public vaccinators who are employed on a permanent basis. In 1948 and 1949, 3,061,955 and 2,080,777 smallpox vaccinations were made (the 1947 census showing a total population of 4,799,500).

Malaria, trachoma and bronchitis were the main hospital cases; the dysenteries, anemias, wounds, syphilis and phthisis were

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164 767 also frequent causes for hospitalization. In 1949 there were 5,876,336 visits to health institutions for treatment.

Public Health Budget

744 662 164 In 1951-52, ID 2,089,180 (7.6 percent of the total budget) were allocated to health services, as compared to ID 187,672 in 1931. Because of the prevalence of endemic diseases and the constant danger of epidemics, it would not be unreasonable to spend 10 percent of the total budget on health services.

759 Salaries for personnel in the medical service appear to be low in relation to the cost of living, although they are not low compared to other civil service salaries. The basic salaries, exclusive of cost-of-living allowances, range from ID 5.15 a month for a dresser, to ID 25 for a doctor and ID 80 for a director-general.

Current Health Conditions

165 In spite of the undeniable progress in health conditions, there is need for further improvement. Definitive data are lacking on total birth and death rates, but some figures are available on the infant mortality rate, which is probably the best index of the social circumstances of an area. For Baghdad, the recorded rate in 1949 was 128 deaths per thousand births. Iraqi doctors who have worked in different parts of the country consider the rate to be about 250 per thousand, on the average, compared with about 34 deaths per thousand live births in highly developed countries.

164 Among the people as a whole, malaria seems to be the chief killer, especially in country districts. In the main cities the leading causes of deaths were intestinal diseases, tuberculosis and respiratory diseases. These diseases and trachoma seriously affect the ability of men and women to work efficiently and are among the major causes of low productivity of labor in Iraq. For example, candidates for the police service are frequently rejected because of defective eyesight and what is characterized as "poor physique" associated with chronic malaria, schistosomiasis, etc. About 20 percent of the young men liable for military service are found to be unfit.

Heart trouble, cancer and other organic disturbances are far outnumbered by diseases which are essentially social in origin. Most of them can be traced to lack of hygiene, poor sanitation and

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congested living conditions combined with a coarse and monotonous diet.

In common with many other countries, there has been a drift to the towns, and unsanitary slums have formed on the outskirts of some cities. Steps should be taken to improve the living conditions of these slum dwellers. So far sewers and sewage disposal are generally lacking in the cities and towns. Baghdad has septic tanks and cesspools, but there are still some open drains; most of the larger towns have similar systems of sewage disposal but conditions in the smaller towns and villages are still very primitive. The disposal of household refuse and the cleaning of streets are generally well carried out in the bigger cities but not in most towns and villages.

Constant pilgrimage traffic creates another problem in public health. The holy shrines of the Shia sect of Moslems are in Iraq and a large number of Iraqis are members of this sect. There is a continuous stream of travelers through the country, including both Iraqis and foreigners, mostly Iranians, visiting the holy shrines, and Iraqi and foreign pilgrims on their way to Mecca. All this traffic exposes Iraq to the dangers of imported epidemic disease and stringent quarantine regulations have been enacted. But the land frontier with Iran is so long that it is quite certain many incoming pilgrims never are subjected to any control measures. This means that Iraq needs internal preventive services of the highest possible standard. Currently, all pilgrims leaving Iraq for Mecca are vaccinated against smallpox and inoculated against cholera.

The need for greater emphasis on preventive measures stands out clearly in even a brief analysis of the most debilitating diseases and their causes.

Intestinal Disorders

Ankylostomiasis (hookworm disease) in itself produces anemia. Many patients are so weak by the time they reach a hospital that they require lengthy treatment. It thrives in an unsanitary environment characterized by inadequate sewage disposal, open drains, and lack of proper latrines. Incomplete surveys indicate that it is most prevalent in the South.

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Pharmacists are licensed by the Director General of Health. An Inspector of Pharmacies inspects private pharmacies, although it would appear reasonable to place the supervision of these pharmacies more directly under the local chief medical officer.

Certain drugs, such as the anti-biotics and sulphonamides, are supplied in most countries only on a doctor's prescription. In Iraq, however, these drugs can be freely obtained at any pharmacy. Hospitals at times suffer from a shortage of drugs owing to the limited funds made available by the government. Thus patients admitted to hospitals sometimes have had to buy drugs for themselves from pharmacies in the towns. It is to be hoped that future budgetary provisions will be sufficient to supply hospitals with the drugs necessary for their work.

Under the present system, local hospitals send their requisitions to the Director General of Health, through the chief medical officer of the province. These requisitions are scrutinized by the Director of Supplies, who passes them on to the Director General of Health for authority to issue the supplies required. The issues are then made direct to the hospital concerned. It seems that most medical supplies—although by no means all—are purchased from the Crown Agents of the British Government. The central supplies are kept in Baghdad in what seems to be an orderly and well-run department. There is at present some congestion in the drugs and dressings section, and new buildings are required to provide adequate space for the many items stocked.

Because Iraq is a country of great distances with many scattered villages and hamlets, during certain seasons of the year small communities may be cut off from medical aid by snow, rain and mud. It is not possible to place hospitals and dispensaries within easy and certain reach of all people throughout the year. There are, however, many simple household remedies such as the anti-malarial drugs, aspirin, DDT powder, iodine and Epsom salts that could be put up in suitable packages with full directions for use. It is suggested that the government package such remedies for sale in village shops at a price within reach of the local people.

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III. The Preventive Services

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While the curative services have developed rapidly, measures for the prevention of disease and the promotion of good health have not kept pace. There is a general appreciation among doctors—both senior and junior—as well as among responsible laymen that the time has come when greater emphasis should be placed on the need for preventive medicine and public health measures. However, there are as yet no Iraqi doctors who have received the special training necessary and who have had the opportunity to gain the experience required to organize and develop these services.

Although public health, as a subject, has been taught in the Royal Faculty of Medicine, there has apparently always been a leaning towards clinical medicine. Present conditions in the medical service do not encourage doctors to devote themselves to public health work. The low salaries paid and the permission to practice privately after government working hours encourage doctors to favor clinical medicine and to specialize if possible. Consequently the villages have been neglected and there is keen competition to work in the larger cities. A recent reorganization in the Ministry of Social Affairs, setting up special divisions for public health and social services in the towns and villages, was designed to promote and develop preventive measures. The first requirement, however, is a trained staff to carry out the work.

Among the measures which might be taken to strengthen the preventive services the following should be emphasized.

Organization of a Sanitation Corps

At present the health inspectors of towns are essentially sanitation orderlies who have learned something by apprenticeship and experience. Many of them work in hospitals to the detriment of the sanitation and public health side of their work. For the future Iraq needs three types of sanitation officers: house-to-house inspectors, sanitation overseers and sanitation inspectors. The sanitary condition of the towns is likely to remain unsatisfactory until some form of house-to-house inspection can be started, aimed

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chiefly at the prevention of mosquito and fly breeding and the cleaning up of conspicuously unsanitary conditions.

House-to-house inspectors are necessary only in towns with a population of over 25,000, which means some 250 inspectors would be required. The 134 health inspectors already employed could form the nucleus of this group and it should not be difficult to find recruits with at least elementary school training.

The *sanitation overseers* would supervise the work of the house-to-house group and would also undertake a wider range of sanitary inspection, including restaurants, foodstuffs supplies, etc. Probably 100 overseers would be enough, and a one-year course should be sufficient to train men for the job. Candidates for training should be drawn, as far as possible, from the ranks of the house-to-house inspectors.

A number of *sanitation inspectors*, about 50 in all, would be required to take charge of districts, to supervise the work of sanitation overseers and the house-to-house inspectors, and to advise on all matters concerned with environmental hygiene in their districts. Candidates for this job would need a sound, general education (i.e. completion of the full intermediate school course) and would require not less than two years of training which would include practical sanitation work of all sorts. Training schools for these inspectors should be set up by a foreign sanitation expert, preferably one with knowledge of and experience in the Middle East. Some buildings will also be necessary, at an estimated capital cost of about ID 10,000.[2]

Training of Midwives

Midwives, who by the nature of their work have free entry into village homes, are among the most important potential health workers. It is they who can give acceptable advice in the home and consequently they could do a great deal to improve health conditions in the villages. Although 803 midwives are licensed to practice, scarcely any of them in either cities or villages have

[2] The recurrent cost of operating the school would be about ID 2,000 yearly. The recurrent cost of the sanitation service when fully organized might be approximately ID 75,000 annually.

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cal assistant) treat simple conditions—and he could well treat cases of most of the major endemic diseases—but he should also be the village "sanitarian". The village midwives should be based at the health center and draw their supplies there. Vaccination against smallpox—of prime importance in Iraq—and other protective innoculations could, as required, be carried out in the centers. Later, public health nurses could be added to the center staffs.

The number of health centers must necessarily depend, among other things, upon local population density, distances and means of communication. Visiting doctors from the hospital to which the center is attached could call at regular intervals to see special cases referred to them by the health official. By such means as these, medical assistance and advice could be brought within reach of most of the people and the best use be made of the doctor's services. At present the district or *qadha* doctors have no means of transport to visit dispensaries.

The additional health officials who would staff these centers could be selected from among the hospital dressers. Since these men have already had considerable clinical experience, it should be possible to train them in about a year. Because they are much closer to the village people than the visiting doctors, they can do a great deal to help the local people. One Iraqi doctor stated that an experienced and happy health official can do better work in a village than an unhappy and disgruntled newly-qualified doctor.

There are about 400 dispensaries at present, some of which are staffed only by dressers. Assuming 20 medical assistants can be trained annually, it should be possible to staff all the present dispensaries and 200 new ones with medical assistants in less than 20 years. The buildings and staff now used by the School for Health Officials (founded in 1932) could equally well be used as a training school for medical assistants.

Training of Public Health Nurses

As soon as some midwives have been trained, a program should be started for the training of public health nurses. These women would hold positions of considerable responsibility, and every candidate for the course should already be a trained nurse and a midwife.

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The most important links with the people are, of course, those who belong to them and who work among them: that is, the dispensary *medical assistants* and *midwives* in villages and the midwives and public health nurses in the towns. *Maternal and child welfare centers* in towns could also provide health education. There are already a few centers operating in Baghdad but there is a great need to open more centers throughout the country as soon as trained staff are available. The proposed house-to-house inspectors, sanitary overseers and sanitary inspectors could all be most valuable teachers.

There is no doubt that *health weeks* would stimulate great interest and health exhibits could be included in agricultural and other shows (e.g. to display measures designed to prevent the spread of malaria, schistosomiasis, etc.). Travelling vans giving film shows might also be of some use.

Elected *public health committees* of the village elders, advised by the medical assistant or visiting doctor, might do much to improve conditions in villages. *Mobile dispensaries* should include in their staff a sanitary inspector and a health visitor (public health nurse) who could go round the village while the doctor is seeing patients.

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It should be noted that the government plans to inaugurate a rural health center at Abu Ghuraib, which is designed to provide curative and preventive services for the population of the area and at the same time serve as a practical field for training rural health workers, with particular emphasis on the control of communicable diseases and maternal and child health. It has requested advice from the World Health Organization on the planning and establishment of the center. Accordingly, in 1950, provision was made under the technical assistance budget of the World Health Organization for a rural health survey. Provision has been made under the 1952 technical assistance budget for one public health administrator with general experience in rural health, one epidemiologist, one sanitarian, and two public health nurses, one with general experience and one with the experience in midwifery. It is expected that the government will submit a request to UNICEF for appropriate supplies and equipment. At a later stage the program may be developed in cooperation with other specialized agencies.

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IV. Endemic Disease Prevention

One of the most important sectors of the entire public health program should be a well-planned attack on the leading endemic diseases, e.g. schistosomiasis, malaria and ankylostomiasis.

The need for better housing, sewage disposal systems and safe water supplies has already been mentioned. Measures to accomplish these improvements are discussed in detail in Annex H, on *Community Planning and Facilities.*

Schistosomiasis

It is clear from available records that at present relatively few persons suffering from schistosomiasis receive treatment. The Schistosomiasis Section of the Endemic Diseases Institute has carried out a survey which shows that the disease does not occur south of Basra and that, north of Basra, after reaching a peak in the Lakes Area, its incidence declines steadily up to the Kurdish mountains, where the disease does not occur at all. In Basra province the incidence reaches 23 percent, in Amara province 67 percent and in Baghdad province 35 percent.

Apart from its debilitating effects, the disease is complicated in a number of cases by bladder stones and calcification of the bladder. Associated as it commonly is with attacks of malaria and infestation with hookworms, schistosomiasis is of profound economic significance since it lowers the individual's capacity for work and his ability to overcome intercurrent infections.

The intermediate host is a snail which lives in stagnant water. Irrigation therefore provides conditions which may cause an increase in the prevalence of the disease, as has been shown in Egypt where schistosomiasis is a major public health problem. Investigations made up to the present indicate that the only fresh water snail which carries the disease in Iraq is the *Bulinus truncatus.* It does not appear to occur in either the Euphrates or the Tigris, or in streams in which water flows at a rate of three or more miles an hour. The cold winter weather inhibits the snail's activity and it is able to multiply freely only during the months of June and July.

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Spread of the disease[1] may be limited by:

1. Destruction of the snail through the use of copper sulphate (or other compounds) and the elimination of stagnant water. The rapid lowering of water levels will also destroy the snail by desiccation, and in irrigation canals a free flow of water makes conditions unsuitable for the snail.
2. Prevention of infection of the snail by the human host. This can be effected by treating the human carriers and by preventing the pollution of water.

In new irrigation projects it is strongly recommended that steps be taken:

1. To design major canals so that they maintain a flow of three miles an hour or more and minor distributory canals so that they dry out rapidly.
2. To site villages and canals, wherever possible, at a distance not less than a mile apart.
3. To provide villages with a separate, protected water supply so that water is not drawn by the inhabitants direct from canals. Where the underground water is unfit for use, water could be drawn from the closest canal by pipe and be passed through a simple filter. The filtered water (it could in some cases by chlorinated) could then be raised by "hydrohoist" or by semi-rotary pump into a gravity tank—if so required. Another important measure would be the installation of village baths.
4. To provide suitable village latrines, some of which should be on the side of the village towards the canal. Experiments should be made to test the feasibility of using pit or bore hole latrines. Public water supplies, baths, and latrines require, of course, attendants to keep them in order. Householders should install their own latrines.
5. To examine, as far as possible, the people who will live and work in the project. If necessary, they should be treated for schistosomiasis before irrigation begins.
6. To treat the canals and all collections of water that harbor the snail with copper sulphate twice a year.
7. To examine annually representative groups such as school children to determine whether the measures taken are effective.
8. To educate the people not to foul water and to promulgate regulations to provide for the protection of water from pollution.

[1] [SCHISTOSOMIASIS -- ANALYST.]

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Shitwi (winter) cultivation is, on account of the low temperature, far less likely to spread schistosomiasis than *saifi* (summer) cultivation. In considering any expansion of summer cultivation, therefore, the attendant health hazards should be carefully considered.

To carry out mass treatment of the people an expansion of the dispensary system is necessary together with the provision of mobile dispensaries. Initially four of these mobile dispensaries might be put into operation in the provinces having the highest incidence of schistosomiasis. The cost of each, including three motor vehicles, tents, 20 beds and supplies, would probably not exceed ID 5,000. In addition, an increase is required in the number of vehicles available to the Endemic Diseases Institute and provision must be made for an adequate and constant supply of copper salts.

Malaria

There can be no doubt that irrigation has been associated with a considerable increase in the malaria of the plains. Gravity or flow irrigation may lead to flooding of land or to seepage due to the faulty construction of canal banks. Water is precious where irrigation is carried out by lift and is not commonly wasted; consequently, flooding of land is rare. A third form of irrigation employed—namely that by natural inundation—is only seasonal.

Much work has been done in the Endemic Diseases Institute on studies of malaria in Iraq and also on the bionomics of the chief vectors of the disease. It has been discovered that in the North the mosquito *A. sacharovi* is associated with high endemicity. It breeds mostly in seepage water, open pools and in rice cultivation, and appears to be associated with sharp outbreaks of malaria when it descends occasionally into the plains.

In the South and spreading as far north as 34°N., *A. stephensi* breeds in similar conditions to those in which *A. sacharovi* develops in the North; it favors particularly water in small borrow pits, seepage water and the small irrigation channels of the date palm gardens. The *A. stephensi* mosquito is generally found in those areas where the level of the subsoil water is high. It is a highly efficient carrier of malaria and used to be found in the houses of Baghdad during the summer.

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164 744 Control measures include larvicidal treatment and the residual spraying of dwelling houses for the destruction of adult mosquitoes. In Basra, weeding of the small irrigation channels in the date gardens to promote the free flow of water is followed by the application of one percent DDT in oil and also by the spraying of the scattered huts at the fringe of the town. After the British Army left Iraq, there was a gradual but progressive relaxation of control measures which, coupled with the high river flood, culminated in a sharp outbreak in 1946. Spleen rates rose to 90 percent in some parts of the town but have since fallen rapidly with the reinstitution of control measures.

Measures designed to reduce the incidence of malaria include the following:

1. Expansion and extension of present control measures to insure:
   (a) An ample and constant supply of the various forms of DDT required.
   (b) An increase in the number of motor vehicles available to the Endemic Diseases Institute for its work.
   (c) An increase in special technical staff as rapidly as personnel can be trained.
2. Drainage in those areas where the level of the subsoil water is high in order to lower the level. Every proposed drainage scheme must, however, be carefully examined and judged on its merits. The drainage of established swamps is not likely to reduce the incidence of malaria; indeed, it may even increase it by providing suitable breeding places for dangerous mosquitos in drains. Amara province, for example, has extensive swamps but the mosquito breeding in them is predominantly the harmless *A. pulcherrimus* and the incidence of malaria is not high.
3. Expansion and extension of the village dispensary system, including mobile and movable dispensaries, to make treatment more freely available to the sick. The sale of antimalarial drugs in village shops would also help those living in hamlets remote from hospital and dispensary.
4. The approval of every new proposed irrigation scheme however large or small and whether government or private, by both the local and central medical authorities.
5. Comprehensive legislation, with effective means to enforce it, to insure the absence from irrigation schemes of conditions prejudicial to health.

1 [AGAINST MALARIA -- ANALYST.]

7: International Bank N, S-4 (1951) 1952 MH1 Iraq MH1

6. Well-trained sanitary staff in sufficient numbers to keep up a continuous inspection of irrigation schemes.
7. Recognition by officials of the Irrigation and Agriculture Departments of those conditions falling within the sphere of their own work that are prejudicial to health. They should also know how to remedy such conditions.
8. Cooperation of various departments. It is of primary importance that irrigation schemes be submitted for approval by the provincial administrative council, on which sits the chief medical officer.
9. The introduction of different crops or new methods of cultivation of existing crops which might have profound effects on the incidence of malaria. Possible examples are the substitution of potatoes for rice or the cultivation of "dry land" rice in the northern mountainous area.

It is understood that the government has sought advice from the World Health Organization on malaria control and that provision has been made under the technical assistance budget for one malariologist, one entomologist and one sanitation expert. The work is timed to begin in the second half of 1951 and to continue throughout 1952.

Ankylostomiasis

A good deal of work has been done in recent years to ascertain the prevalence and effects of hookworm disease. Improvements in sewage disposal, the closing of open drains, the provision of suitable latrines and the wearing of shoes are all measures that will assist in reducing the incidence of hookworm disease. Until such permanent improvements can be effected, much can be done by making treatment more freely available through extension of the village dispensary system and special treatment teams in mobile or movable dispensaries. These treatment teams should also undertake simple treatment for other conditions, especially schistosomiasis.

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V. Organization of Health Services

744 647 It is most important that a properly organized program should be established to carry out the suggested medical services and preventive health measures.

The existing organization for the health services is highly centralized—first within the Ministry of Social Affairs in Baghdad, then in the hands of the Chief Medical Officers of each province. The whole system appears to be too rigid throughout, without sufficient delegation of responsibility and without enough consultation among departments of the Ministry or with those of other Ministries. Certain medical problems (e.g. health in irrigation schemes, nutrition, etc.) concern other ministries or departments (irrigation, agriculture, education, etc.). To be really effective, boards or committees should include representatives of all groups concerned.

There is no general board of public health but there are various committees with different functions. The Director General of Health is responsible for the licensing of private practitioners and pharmacists, and he has a committee to assist him. But it is the Minister who sets up a committee to consider disciplinary Cases brought against practitioners or pharmacists by the Director General of Health. There is also a committee consisting of three Directors General and two other members nominated by the Minister who act in an advisory capacity to the Minister. It would be reasonable to expect the Directors General to be given wide powers without need for frequent reference to the Minister.

744 647 732 747 The health services have been repeatedly reorganized. The latest reorganization still does not appear to have defined very clearly the principal lines of responsibility. The Director General of Health is to be largely responsible for the curative services; a Director General of Health Affairs, for the public health services of Baghdad, Basra, Mosul, and Kirkuk, for the mobile dispensaries, and for health projects in cities, villages, and the countryside; and a Director General of Social Services, for the supervision of the administration of the institutions for the disabled and the blind, supervision of reformatories and health conditions in prisons and

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for the promotion of 'social centers'. It is understood he will also "take an interest" in the numerous voluntary societies that undertake work of a social and medical nature.

While this organization does not seem satisfactory, no alternative can be suggested at the moment without further study. The Mission would recommend that a foreign public health administrator be appointed to advise the Minister of Social Affairs on the organization and further development of the health services. His appointment, incidentally, would enable the Professor of Preventive Medicine in the Royal Faculty of Medicine, who is at present also acting as adviser to the Ministry of Social Affairs, to devote his full time to teaching and research.

The public health administrator should have had wide experience in the Middle East or in a tropical or sub-tropical country. He should have a good knowledge of the English language. To assist him he will require the services on temporary appointment of a foreign epidemiologist and a public health or sanitary engineer. The epidemiologist would undertake a study of the most prevalent diseases and recommend the best methods of attacking them. The public health engineer should have had considerable experience, preferably in a state medical service in a tropical or sub-tropical country, and be able to speak English. He would advise on measures to be taken to improve sanitation and environmental hygiene throughout Iraq and assist, if necessary, in teaching at the Royal Faculty of Medicine.

The public health administrator would require sufficient and suitable transport for himself and his staff; he would also need adequate office accommodation and office staff for himself and his own expert staff (epidemiologist and public health engineer). He should have at all times direct access to the Minister of Social Affairs.

As a result of the studies made by this team of advisers, it may be possible to give the organization of the health services a clearer focus. In any such scheme the preventive aspects of public health will need to be featured much more prominently. Although the borderline between curative and prophylactic measures may not always be clear, it may prove feasible to have one division responsible for all the services primarily curative

7: International Bank N, S-4 (1951) 1952 MH1 Iraq MH1

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and another division responsible for those characterized as principally preventive.

Meanwhile one important improvement could be effected by delegating more responsibility to the chief medical officer in each province and enabling him to devote his entire time to his public duties. The chief medical officer is responsible for all medical work, both preventive and curative, within the boundaries of the province. As such, his main duties should be to inspect the health institutions, to appraise the state of public health and to guide, advise and encourage his subordinate staff. To carry out this task effectively he needs to devote his full time to the job and should be free to travel freely about the province. At present, however, the chief medical officer usually has a private practice on the side. Without means of transportation at his disposal and, in fact, unable to travel without express permission from the Director General, he seldom leaves his headquarters. It is strongly recommended that these officers be paid salaries commensurate with their responsibilities and the importance of their post. Further, they should be provided with suitable transport and be required to submit a monthly report on the inspection work undertaken throughout the province. When necessary, a director (or medical superintendent) should be appointed to the hospital of the chief town of the province to free the chief medical officer for general inspection of all medical facilities under his direction. Similarly, doctors in charge of districts or *qadhas* should be provided with suitable transport to enable them to visit the dispensaries in their area. In certain districts they should also be provided with suitable housing.

It should be remembered, however, that without qualified personnel no reorganization, no matter how effective on paper, will succeed. In the health service, as in many other branches of the administration, conditions of employment must be considerably improved, particularly outside of Baghdad. Unless adequate salaries and accommodations are provided for the health services staff, doctors and trained personnel will continue to prefer private practice and specialized work in Baghdad and other cities.

5: Harrison D-4 (1912-1924) 1924 M1 Middle East
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try rather than fostering the development of something indigenous and natural. Under such a system the enforcement of law may become of necessity very mechanical, as when an Indian Sepoy nearly knocks down an inoffensive Arab pedestrian by a blow with his fist for no greater crime than walking on the wrong side of the road to avoid a mud puddle. In the courts, too, a crowd of lawyers and an abundance of red tape, with venal underlings, may serve to make the paths of justice tortuous and uncertain in spite of the best intentions on the part of the presiding judge.

Nevertheless, even under such handicaps as those we have indicated, there is no questioning the very great material progress that is to be seen in Mesopotamia. Even before the war one of Baghdad's streets was paved, and since the British have taken over the administration of the kingdom, all sorts of improvements have been introduced. The railroad system of the country now extends 360 miles from Basra to Baghdad and from there on nearly to Mosul. There are several subsidiary lines, the total amounting to over 1000 miles. By far the greater part of this mileage was constructed by the British for war purposes. Under British rule, also, the Hindiya Barrage and other less important irrigation works have been kept in order and improved and extensive harbor improvements at Basra undertaken.

British sanitary and health officers have been appointed for Mesopotamia and no praise is too high for their largely unappreciated but nevertheless unselfish and extremely efficient labors in that country. The hospital work that has been undertaken in Basra, Baghdad and Amara, the inspection of eating houses, and the maintaining of sanitary conditions have been excellently done.

44:Matthews and Akrawi S, G-3 (1945-1946)1949 MI Middle East
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871 The Educational Missions Section has charge of the affairs of students
647 selected for study abroad at government expense and keeps records of all students who study abroad at their own expense.

744 The Medicine and Hygiene Section[1] safeguards the health of the school children. It inspects school buildings, conducts regular health examinations of pupils, treats those who suffer from diseases, trains teachers in first aid and simple treatments, propagates health information, and supplies schools with drugs and first-aid materials. In addition, it gives physical examinations at government expense to all teachers and officials entering the service of the Ministry of Education and all students entering the various schools and colleges. This section has set itself the task of fighting the three endemic diseases—trachoma, malaria, and bilharziasis—prevalent among school children. In 1943–44, 67,415 pupils out of the total public-school registration of 104,359 were examined; and of those examined, 16,599 were found to have trachoma, while 3,253 suffered other eye diseases; 5,864 had malaria, and 1,299 had bilharziasis. Treatment of those afflicted with bilharziasis resulted in steady improvement. The fight against trachoma has proceeded systematically, and the percentage of school children suffering from it is being reduced. Much effort has been expended on the campaign against malaria in all the provinces. The Medicine and Hygiene Section began very humbly in 1931 with the appointment of one doctor. By 1942–43 it had twenty-one doctors, two dentists, ten women nurses for the provinces, and more than seventy other health workers. In 1943–44 it maintained twenty-nine clinics throughout the country, and more recently a special hospital for students was established in Baghdad. Treatment at the clinics and at the hospital is free.

Provincial directors of education

871 There is a provincial director of education for each of the fourteen
635 provinces of Iraq. He is responsible to the Director General for the proper functioning of all schools and educational institutions in his province with the exception of teacher-training colleges, some of the vocational and special schools, and higher institutions; these exceptions are the direct concern of the central office of the Ministry. It is the function of the provincial director to make sure that teaching in the schools within his jurisdiction is in accordance with accepted syllabuses, to supervise the behavior of teachers and education officers in his province, and to carry out instructions of the Director General. The regulations of 1945 provide for provincial advisory education councils under the chairmanship of the governor and with the director of education as secretary. These councils

[1] [Of the Ministry of Education.—Analyst]

44:Matthews and Akrawi S, G-3 (1945-1946) 1949 M1 Middle East
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values and invalid cooking, theoretical and practical nursing and first aid; for the second and third years, anatomy, physiology, elementary science, gynecology, surgery and medicine, and theoretical and practical nursing. Specialization in midwifery requires an additional year of study. 874x

THE SCHOOL OF HEALTH OFFICIALS

The School of Health Officials was established to relieve the pressing need for medical service. Graduates of intermediate schools are enrolled in a two-year course, at the end of which they are given nine months of practical experience in a government dispensary or clinic. Thus trained, health officials may be assigned to assist medical officers or be sent to outlying villages to work under the supervision of a district medical officer. They are considered to be qualified in first aid, minor surgery, and diagnosis and treatment of common diseases. On independent duty they are placed in charge of government dispensaries where treatment is free. They are responsible for the collection and reporting of data on diseases and health conditions. [144]

No tuition fees are charged, since the student agrees to work for four years in the government health service, but in the absence of boarding facilities the student must pay for all living expenses. His salary in his first appointment is eight dinars ($32) a month, but it has been recommended that this be increased to 10 dinars ($40) after one year of practice. In 1945–46 there were 28 students in the first-year class and 26 in the second. The second-year class of that year was the first for which completion of the nine-month practice training was required.

The first-year students study inorganic and organic chemistry, materia medica, public health, bacteriology, anatomy, internal diseases (general), surgery (general), nursing, and English. In the first half of the second year they study dispensing, medical accounting, public health, skin and venereal diseases, materia medica, dentistry, endemic diseases, the ear, nose, and throat, ophthalmology, internal diseases (special), surgery (special), English, and health laws. The second half of the year is spent in practical study in the various clinics of the hospital. Having fulfilled all requirements mentioned, the student receives the Certificate of Health Official. It has been recommended that this certificate should be rated with that of the secondary school for purposes of admission to the School of Pharmacy and the College of Medicine. It is assumed that the School of Health Officials will be discontinued when Iraq has sufficient fully qualified doctors to answer all needs. However, at the present time doctors avoid village practice because of the unsatisfactory living conditions

of the city, except in some of the poorer districts, where community taps are installed. The construction of additional plants for the treatment of the water supplies in the surrounding towns was planned in 1952. 312 364

At Basra, the water supply for the 3 townships and some of the adjacent villages is taken from the Shatt al Arab. It is treated by filtration and chlorination at Jubailah before distribution to suitably located storage tanks, from which it is piped to individual houses and community taps. The municipal supply of Mosul is derived from the Tigris River and treated by filtration and chlorination. River supplies are utilized by the capital cities of all the provinces, except Erbil and Sulaimaniya, on the northeastern border, where adequate spring sources are available. Treated water is furnished by the Iraq Petroleum Company to its installations in the vicinity of Kirkuk, and a portion of the supply is delivered by the company to the municipality. In the various cities the drinking water supplies are supervised by the municipal authorities. Bacteriologic examinations are made periodically in the laboratories of the government health services. No control is exercised over the smaller supplies, however, except when gross pollution is suspected. [744]

The waters of the Tigris and the Euphrates rivers have been utilized for irrigation for centuries, and the existing ruins appear to indicate that the ancient systems were more extensive than those in use today. Pumps and more primitive types of lift irrigation predominate, but other methods are employed along the course of the rivers, including tidal flow irrigation on the Shatt al Arab and free flow irrigation in the lower delta. In the northern provinces, local irrigation systems, fed from underground conduits which tap springs in the foothills and are connected by series of wells, are found in many areas. These *karez* are comparable with the *qanats* of northern Iran. 312

Several large-scale projects have been undertaken for the purpose of regulating

southern provinces and has been held responsible for sporadic outbreaks of dengue fever. It is also a potential vector of urban yellow fever, although that disease is not reported from this region. Many varieties of Culex mosquitoes have been recorded, but none has been specifically implicated in the transmission of disease. *Culex quinquefasciatus* (— *C. fatigans*) or *C. pipiens* (each a potential vector of *Wuchereria bancrofti*) is present in most areas.

Within recent years extensive mosquito control work has been undertaken by municipal and government authorities, by the oil companies and, during World War II, by the British Expeditionary Forces. The problem is stupendous, involving the improvement and the regulation of the irrigation facilities on which the agricultural economy of the country depends. In 1947, malaria control was first attempted on a nation-wide basis with the creation of an antimalaria service within the Iraqi health organization. Since that date, control operations have been carried on in various highly endemic areas. Depending upon local conditions, they have included antilarval measures, drainage works and residual spraying of the rural villages with DDT preparations. In 1952, a demonstration DDT house-spraying program was initiated in the hyperendemic Tanjero Valley of Sulaimaniya *liwa* (province), in conjunction with the World Health Organization.

FLIES. Flies are prevalent in all parts of the country. Numerous species of MUSCIDAE are encountered, many of which are implicated in the mechanical transmission of intestinal and eye diseases. *Musca sorbens* and *M. domestica vicina* are most frequently incriminated, but *M. tempestiva*, *M. vitripennis* and *M. mesopotamiensis* are also abundant. The larvae of *Fannia canicularis* sometimes cause myiasis in the livestock. The stable fly, *Stomoxys calcitrans*, is almost ubiquitous. At least 22 species of *Tabanus* are recorded, and many local authorities believe that they are involved in the mechanical transmission of anthrax.

ous sea snake, *Enhydrina schistosa*, roams the Persian Gulf and the Shatt al Arab. Although it may be dangerous to fishermen, no fatalities are known to have occurred. 136 762 165

Rodents. *Rattus rattus frugivorus* is the rat most frequently encountered in Iraqi dwellings. *R. rattus alexandrinus* is also indigenous, while *R. norvegicus* is present in Basra, Baghdad and the river towns. *Nesokia buxtoni*, *Dipodillus dasyurus* and *Meriones charion* are reported from different localities. Rats are often captured in Baghdad and Basra and examined for evidences of plague, but otherwise little rodent control work is undertaken, except at the time of plague outbreaks. 136 164

Mollusks.* *Bulinus truncatus* (— *B. contortus*), the intermediate snail host of *Schistosoma haematobium*, is found in numerous foci in central and southern Iraq, where pump or gravity flow irrigation is employed. It inhabits the many small and sluggish irrigation canals and the rice fields, borrow pits, marshes and other suitable collections of water, but is strictly seasonal in appearance, being abundant only in the summer and the fall months, from May or June to November. The snails are widespread in Basra, Muntafiq, Diwaniya and Amarah provinces in the south, but are absent from the Shatt al Arab region south of Basra, where breeding is restricted by the salinity of the water. They are more scattered in distribution in the central provinces and practically nonexistent in the north, aside from localized foci around the marshlands of the Mosul area. *Radix lagotis canaliculata*, a vector of *S. turkestanicum* which causes serious infections among the livestock, is found in the rice fields and the marshes of the southern delta. 136 232

The threat of the spread of *Bulinus truncatus*, and subsequently of schistosomiasis, with the expansion of irrigation creates a problem which is of major public health and economic importance to the country. Small-scale snail-control campaigns have been undertaken in the past in Baghdad, Basra and 136 164 744

* See footnote, page 10.

83. Simmons et al G-5 (1941-1951) 1954
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Diwaniya provinces. In 1949, a co-ordinated control program was introduced by the Iraqi government, and a Bilharzia Section was established within the national health organization. The section initiated a snail survey in the various endemic foci and research on the most effective methods of snail control. It carries on continuous snail destruction work through special units assigned to each of the infected provinces.

Plants. Little precise information is available regarding the prevalence of allergy-producing plants, but numerous weeds, grasses and trees, which have been incriminated in other countries, are present in districts with rainfall adequate to support such vegetation.

Occasional deaths, primarily among young children, have been traced to the consumption of the raw beans of *Vicia fava*, a prominent food crop throughout this region. The beans are toxic to susceptible individuals in the raw state. Plants of the *Senecio* group grow in sections of the northern highlands. The young green shoots are poisonous and sometimes cause fatalities among the livestock.

Food Sanitation

The government and municipal health authorities are responsible for the enforcement of regulations governing the sanitary quality of foods, meats and milk products, but the degree of enforcement varies in different localities. Health inspectors are charged with the supervision of establishments where foods are prepared or sold, such as foodshops, markets, restaurants and cafés, mineral-water bottling works and date-packing houses. Examinations for the presence of venereal diseases are theoretically required at regular intervals in the case of cooks and barbers, but no tests to detect other infections are carried out.

Meat animals are inspected before and after slaughter in the city abattoirs by officers of the government veterinary and health services. All carcasses offered for sale are supposed to bear an official stamp of

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744 approval, but illegal slaughtering takes place in many areas. No effective control is carried out in the rural villages, where the animals are slaughtered locally.

234 744 Milk from cows and goats is marketed by large numbers of small producers. Government regulations exist for the sanitary inspection of dairies and the periodic tuberculin testing of cattle. In practice, however, few controls are exercised over the methods of production or the quality of the product. There is only one pasteurization plant in the country. This is located in Baghdad, and is operated by the government's Agriculture Department. It was established primarily for the purpose of supplying pasteurized milk to the child welfare centers, but a small percentage of its output is sold to private customers. Milk is customarily boiled before use, but butter and cheese are often vehicles for the spread of brucellosis and other diseases. Brucellosis is enzootic among the cattle and the goats, and bovine tuberculosis among the dairy herds.

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HEALTH SERVICES AND MEDICAL FACILITIES

Health Organizations

744 657 Responsibility for the protection of the public health and for the provision of medical care facilities is centralized in the Ministry of Health of the Iraqi government, with headquarters in Baghdad. The Ministry was established in 1952, replacing the former Directorate General of Health in the Ministry of Social Affairs. Under the present organization, the Minister of Health is assisted by a Director General of Health, in charge of health and medical services, and by an Inspector General of Health. The Minister also has jurisdiction over the Royal Faculty of Medicine which administers the Royal Hospital and the Royal College of Medicine in Baghdad.

The functional activities of the Ministry are concentrated in two major divisions—curative medicine and preventive and social medicine—as well as in a number of admin-

ISTRATIVE BRANCHES.
p. 32(A)

63:Simmons et al G-5 (1941-1951) 1954
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000 istrative branches. The Director of Curative
744 Medicine has supervision over 4 depart-
657 ments: hospitals, dispensaries and pharma-
743 cies; rural health; technical institutes, including 6 laboratory sections; and medical stores. Under the Director of Preventive and Social Medicine are departments of endemic diseases, sanitation, social health, quarantine and epidemics, vital statistics and disease registration. Subordinate sections dealing with maternal and child health, venereal diseases, pulmonary diseases and health propaganda are incorporated in the Department of Social Health, while supervision over the health services of both the province and the city of Baghdad falls within the scope of the Department of
742 Sanitation. The Department of Endemic Diseases carries on research and field programs for the control of malaria, schistosomiasis and hookworm infection, some of which were initiated by the then Institute of Endemic Diseases, created in 1949. Further changes in organization, making the Director of Preventive and Social Medicine a Director General immediately responsible to the Minister, were proposed in 1953.

746 Subordinate provincial organizations carry out the functions of the Ministry of Health in the 14 *liwas*, or provinces. Chief medical officers are appointed to each *liwa* and are responsible for the conduct of the various medical services. They undertake some public health activities, but, to a large extent, the preventive services are directed from Baghdad. Municipal health divisions are established in Baghdad and the principal cities.

744 Other ministries are also concerned in some measure with the public health. The Ministry of Education operates school health services in Baghdad and the larger urban centers, and introduces instruction in the basic principles of health through the schools in urban and rural areas. The Ministry of Economics has veterinary and agriculture departments: the former has meat and dairy inspection services; the latter runs an experimental farm and a pas-

63:Simmons et al G-5 (1941-1951) 1954
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teurization plant near Baghdad and seeks to improve the standards of agriculture which should be reflected in better nutrition among the people. The Ministry of Communications and Works maintains health and medical facilities at the port of Basra, and furnishes medical care for railway personnel.

Several voluntary agencies carry on health work, usually in co-operation with the Ministry of Health. The Children's Welfare Society conducts an extensive program for the promotion of maternal and child health, and operates welfare centers in Baghdad and the administrative centers of the remaining provinces. The Red Crescent Society supports a child health center in Baghdad, and provides training for girls in first aid and home nursing through branches in Baghdad, Basra, Hilla, Amarah and Kirkuk. The Anti-Tuberculosis Society campaigns against tuberculosis, and contributed toward the erection of a sanatorium, opened in 1951, near Baghdad. The Catholic Nuns Society runs a small general hospital and dispensary, and the Society of Buyout el Umma an ophthalmic hospital and dispensaries in Baghdad.

The Board of Foreign Missions of the Reformed Church of America maintains a medical mission in the Amarah region. It operates a hospital and founded the leper colony, which has since been taken over by the government. The Seventh Day Adventists also have a hospital in Baghdad. The Iraq Petroleum Company and its subsidiaries, the Mosul Petroleum Company and the Basra Petroleum Company, provide medical and health services for the benefit of their employees.

Medical Institutions

Hospitals and Dispensaries. In 1950, there were 82 civilian hospitals in Iraq with an aggregate capacity of 4,901 beds, or slightly over 1 bed per 1,000 population. Of this number, 2,086 beds were located in Baghdad, 534 in Basra and 412 in Mosul provinces. Sixty-seven hospitals, with a

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743 82 beds for emergency care, and field ambu
466 lance services. The Basra Petroleum Company maintained a 15-bed hospital at Basra, a 16-bed hospital at Fao and 12 emergency beds in 2 detention camps. The Mosul Petroleum Company had 10 beds for emergency cases in a camp near its exploration activities.

743 In addition to the regular hospital clinics, 433 dispensaries were scattered throughout the provinces in 1950. Of this number, 403 belonged to the government health services: 145 were staffed by physicians and the remainder by assistant medical personnel. There were also 11 mobile dispensaries, which covered the more remote villages and tribal areas, and 2 floating dispensaries on the river in Basra and Muntafiq provinces. Only 7 tuberculosis dispensaries existed in 1950, but 13 dispensaries, some with facilities for 20 beds, were under construction in the provincial capitals. The Ministry operated 5 ophthalmic dispensaries and 4 "institutes" for the treatment of venereal diseases. A diagnostic and research center was organized in Baghdad in 1950, in connection with the syphilis-bejel control project being conducted under the auspices of the World Health Organization.

743 The infant and child welfare centers
744 functioning in 1950 totaled 21, most of which were supported by the Children's Welfare Society. Ten centers were located in the Baghdad region. An expanded maternal and child health program is now being developed by the Ministry of Health. In 1952, it started a demonstration and training project at Samawa, with assistance from the Technical Co-operation Administration of the United States government. Another demonstration center for the training of local medical personnel in the principles of maternal and child health is scheduled to be opened in Baghdad in 1953-54, in conjunction with the World Health Organization and the United Nations International Children's Emergency Fund. The proposed program of the Ministry calls for the crea-

63:Simmons et al G-5 (1941-1951) 1964
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742 tion of rural health centers, each to serve
744 an area of 20,000 to 30,000 population, as rapidly as adequate staff and funds become available.

742 Laboratories. The central laboratory facilities of the Ministry of Health are concentrated in 6 institutes, all with headquarters in Baghdad. The pathologic and bacteriologic institutes are associated with the Royal College of Medicine, and combine research and teaching with routine laboratory functions. The Institute of Bacteriology consists of a diagnostic section, equipped for the conduct of serologic, bacteriologic and parasitologic examinations, and a vaccine unit for the preparation of typhoid, plague and cholera vaccines. The Institute of Pathology has divisions for the performance of biochemical and pathologic examinations. A third institute merges the former Vaccine Lymph Institute, which manufactures smallpox vaccine for use throughout the country, and the Antirabic Institute, which prepares rabies vaccine and provides treatment and diagnostic services. The Medico-Legal Institute incorporates forensic medicine, anatomy and photographic sections. The Chemical Institute has facilities for the analysis of food, water and milk, and of various agricultural and industrial preparations. An Institute of Roentgenology, with branches in Baghdad, Basra, Mosul and Kirkuk, furnishes diagnostic and treatment services. The Department of Endemic Diseases operates a diagnostic and research laboratory in Baghdad, in connection with the government's malaria, schistosomiasis and hookworm control programs. Field units are stationed in the northern, the central and the southern provinces.

An Institute of Medical Research is established at the Royal College of Medicine: it includes clinical divisions and pathologic, chemical and biochemical laboratories. A research serologic laboratory is maintained in Baghdad in conjunction with the World Health Organization's syphilis-bejel control program. Clinical laboratory

were reported in 1923, 1927 and 1931. Since 1931, cholera has been almost completely absent from the country, although one imported case was recorded in 1939, when the disease was epidemic in Afghanistan and Iran. 164

Strict quarantine regulations are enforced, and travelers from India, Pakistan and Ceylon, as well as pilgrims from Mecca, without valid certificates of immunization against cholera are retained in quarantine centers for a period of 7 days. Mass immunization with cholera vaccine is carried on among the populations in the border provinces whenever epidemics are reported from the adjacent territories. At the time of the recent epidemic in Egypt, in 1947, immunization was compulsory for all travelers entering the country and for the inhabitants of towns and villages along the Syrian frontier. 744 484 164 751 164

Helminthiases. SCHISTOSOMIASIS. Schistosomiasis, caused by *Schistosoma haematobium*, has probably been present in the lower Tigris and Euphrates river basins since ancient times. It is highly endemic in the southern and the central provinces, where the intermediate snail host, *Bulinus truncatus*, is found in widespread but often localized foci. The disease is prevalent among the children and among the agricultural and other laborers who work in infested waters, particularly the men and the boys, who are exposed to infection to a greater extent than the women. It reaches maximum proportions between 10 and 20 years of age, but is usually negligible in early childhood. Transmission is seasonal: it takes place from May to the end of November, but primarily between June and October, when infected snails are most abundant. The insanitary customs of the inhabitants, associated with the frequent use of the canals for religious ablutions and the severe summer heat which is conducive to bathing in any convenient body of water, are contributory factors. The infection rates average 18 to 25 per cent in the irrigated districts of the delta, but vary from zero 164 136 164 462 164 515 164 361

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164 361 369 Basra to 75 per cent at Al Qurnah, in the fork between the rivers. In Muntafiq, the mean rate was 47 per cent, and in Diwaniya, 26 per cent, although some districts were heavily infected and others practically free. In central Iraq the disease was more irregular in distribution. In Baghdad *liwa* the infection rates averaged 35 per cent, but approached 80 per cent in some localities. In Kut, the mean was 48 per cent, with a decrease in prevalence toward the Iranian frontier. In Hilla, it was 15 per cent, with variations from 5 to 50 per cent, and in Kerbela, 28 per cent, with variations from 18 to 48 per cent. In the areas studied in Diyala *liwa* it ranged from 28 to 60 per cent, and in Dulaim it approximated 36 per cent. Subsequent surveys have revealed 11 to 18 per cent infection in limited foci near the marshes in Mosul *liwa*.

164 361 369 742 In a survey conducted in Baghdad in 1950-51,[87] ova of *S. haematobium* were found in 25 per cent of the urine samples collected from 285 schoolchildren and in 46 per cent of the samples from 242 inhabitants in hut settlements on the outskirts of the city. The prevalence was around 20 to 25 per cent in the suburbs, but reached 83 per cent in foci along the main road to Teheran.

164 462 Indigenous cases of *S. mansoni* infection have not been reported, but numerous cases of rectal involvement with *S. haematobium* have been observed. A dermatitis produced by nonhuman schistosome cercariae is common in the south and is often responsible for considerable disability among the agricultural workers.

164 462 312 744 Schistosomiasis constitutes one of the most important disease problems in Iraq. It is of major public health and economic significance, and the possibility of its spread with the expansion of irrigation is a matter of considerable concern to the government authorities. An active schistosomiasis control program is carried on by the Bilharzia Section of the Department of Endemic Diseases. This section maintains snail destruction and treatment units in the affected

provinces, and conducts research and field investigations on the distribution and the control of the disease and the intermediate snail host. In the 7 years 1944-50, from 15,800 to 27,300 persons were treated annually in government hospitals and dispensaries. The disease is considered commonplace in most areas, however, and probably not over 5 to 6 per cent of the infected individuals seek treatment under ordinary conditions. Since 1949, special dispensaries have been established in Baghdad, Basra and Kufa, while mobile clinics tour the most seriously infected districts. In 1950, there were 11 mobile units for the treatment of schistosomiasis, malaria and hookworm infection among the rural populations.

ANCYLOSTOMIASIS. Ancylostomiasis is widespread in the irrigated areas, but the exact distribution and severity of the infection in the different provinces are not accurately known. *Ancylostoma duodenale* is the only species found in the foci studied. The infection rates are generally estimated at 10 to 20 per cent in the northern provinces and at 40 per cent in the southern. They are especially high in the Amarah and the Al Qurnah regions, but decrease toward the south, and are relatively low in the districts along the Shatt al Arab. In a study reported in 1939,[47] fecal specimens from apparently healthy men, 18 to 20 years of age, from various parts of the country were examined for hookworm ova. The presence of ova was detected in 25 per cent of the specimens from 125 men from Baghdad and in 46 per cent from 135 men from the rural districts of Baghdad *liwa*. Comparable examinations revealed ova in the specimens from 26 per cent of the individuals examined from Diyala *liwa* and from 25 per cent of the individuals from Dulaim. The degree of infection is usually mild, but serious cases with hemoglobin indices as low as 10 per cent are not infrequent.

Treatment facilities are provided by the schistosomiasis control units, as well as by the government hospitals and dispensaries.

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An ancylostomiasis section is incorporated in the Department of Endemic Diseases, and a program for the improvement of rural sanitation is being developed by the health authorities. 164 744

Other Helminth Infections. A large proportion of the inhabitants harbor one or more types of intestinal worms. Ascariasis predominates in the northern and the central provinces. Heavy infections, often with intestinal obstruction, are common. In the studies made on groups of men of 18 to 20 years of age, as indicated above, ova of *Ascaris lumbricoides* were found in the fecal specimens from 10 per cent of the 125 individuals examined in Baghdad city. In the provinces, ova were detected in fecal samples from 9 per cent of 135 persons from Baghdad, from 15 per cent of 145 persons from Dulaim and from 13 per cent of 309 persons from Diyala. 164 136 742

Enterobiasis, trichuriasis and, to a lesser extent, strongyloidiasis are prevalent. *Trichostrongylus*, a parasite of sheep and goats which sometimes infects man, is widely distributed in the Shatt al Arab region. Infections with the dwarf tapeworm, *Hymenolepis nana*, are numerous. The beef tapeworm, *Taenia saginata*, is often encountered, but not as widely as in Syria and other Arab countries where more raw meat is customarily consumed. The pork tapeworm, *T. solium*, is occasionally observed in the Christian communities. 164 136 232

Hydatid disease is endemic, especially in the central provinces. Stray dogs are numerous and serve as primary reservoirs of infection. In a survey published in 1940,[46] adults of *Echinococcus granulosus* were found in 18 per cent of 123 street dogs examined in Baghdad. Hydatid cysts were seen in the carcasses of 12 per cent of 2,347 sheep and goats slaughtered in the municipal abattoir and in 25 per cent of 223 cattle. 164 136 232 742

Other Infections. Brucellosis is enzootic among goats, sheep and cattle, and sporadic human infections result from the consumption of cheese, *leban* and other unboiled 164 232 758

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83:Simmons et al G-5 (1941-1951) 1964
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where the infection was introduced by refugees from Amarah and has spread in the *serifa* settlements and the slum sections of the city.

A syphilis and bejel control program was initiated in 1950 by the government health authorities, in conjunction with the World Health Organization and the United Nations International Children's Emergency Fund. A dispensary and training center and research laboratories are maintained at the headquarters in Baghdad, while field units conduct surveys and mass treatment campaigns in the provinces. Investigations on the distribution and the relative prevalence of the infection, the significance of possible insect vectors, the most effective methods of treatment and the radiologic and the serologic aspects of the disease are being carried forward by the headquarters and field personnel.

Diseases of the Eyes. Trachoma is widespread, and is regarded by many as one of the most important endemic diseases in the country. The cases treated in government institutions usually average over 500,000 a year. The infection rates are uniformly high in the central provinces, and, in 1950, were calculated at over 233 per 1,000 population in Baghdad, 195 in Kerbela, 140 in Diyala and 102 in Hilla *liwas*. In the remaining provinces they ranged from 24 to 70 per 1,000. The density of population and the concentration of medical facilities in central Iraq cast some doubt, however, that such figures are representative of the degree of infection in the different regions. Cases of advanced trachoma are common, while local authorities estimate that 25 to 40 per cent of the children in many districts suffer from some form of the disease. Statistics from the government hospitals and dispensaries for the 15 years from 1929 through 1943 show that 53 per cent of all the eye diseases treated and 26 to 36 per cent of the total infections were trachomatous in origin.

Conjunctivitis, including both infectious and noninfectious types, is almost equally

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to 300 patients in residence. A comprehensive leprosy control program is planned for the near future by the Ministry, in co-operation with the World Health Organization.

Other Infections. Rabies is enzootic among dogs, jackals and other animals. The jackals, the principal reservoir, often invade the villages and the outlying sections of the towns. Human infections occur sporadically: in 1944-49, the recorded cases averaged from 4 to 32 a year. In the same period, from 739 to 1,365 persons were treated annually at the Antirabic Institute in Baghdad. The majority gave a history of having been bitten by rabid dogs. The Institute also prepares rabies vaccine for distribution throughout the country.

Anthrax is prevalent among the sheep. From 130 to 225 human cases are reported annually among persons in contact with infected animals, or among individuals working with hides or wool. Tetanus is sporadic: the known incidence totals 130 to 250 cases each year. Tetanus neonatorum is common, especially in the rural areas. Cases of human glanders are seen from time to time. Leptospirosis, or Weil's disease, is occasionally encountered in the southern provinces. However, no evidence of infection with *Leptospira icterohaemorrhagiae* has yet been found among the rats captured in Baghdad.

Diseases Spread by Arthropods

Malaria. Malaria is endemic or hyperendemic throughout most of Iraq. The distribution and the severity of the disease vary with the physiographic features of the different regions and the amount and the type of irrigation. It has always been regarded as a disease of primary importance in the country, but within the last few decades it has become increasingly prominent in the southern provinces due to the expansion of irrigation facilities. The cases of malaria treated in government institutions in the 7 years 1944-50 averaged about 598,800 annually. The case rates in the various provinces, based upon the at-

seasonal distribution of the different species of malarial parasites. *Plasmodium falciparum* appears to predominate in most localities with a moderate to high rate of endemicity, as well as during epidemics in all parts of the country. *P. vivax* is also widespread. It is often observed in the blood of infected individuals, even in hyperendemic areas, during the nontransmission season, and the local authorities state that it is unusually difficult to eradicate certain strains in the course of treatment. *P. malariae* is reported more or less sporadically. In certain areas in northern Iraq, it is being encountered with increasing frequency, and some evidence exists that it may be found to take the place of *P. vivax* as the principal species concerned with clinical relapses. Among the 2,865 to 4,281 cases of malaria treated annually in the hospitals and the dispensaries of the Iraq Petroleum Company in 1946 through 1950, from 8 to 53 per cent were identified as *P. vivax* infections, from 0.7 to 7 per cent as *P. falciparum* and up to 8 per cent as *P. malariae*. The remainder were diagnosed on a clinical basis. *P. ovale* was reported recently, but the origin of the infection was obscure. Blackwater fever is rare, although cases are sometimes seen in Basra and in the northern highlands.

Malaria control measures have been carried on in limited areas under the auspices of governmental or other agencies. The Department of Endemic Diseases of the Ministry of Health conducts anopheline control and treatment programs in highly endemic areas throughout the country through subordinate units in central, southern and northern Iraq. A rural health and malaria control project was initiated in the hyperendemic Tanjero valley in Sulaimaniya *liwa* in 1952, in co-operation with the World Health Organization.

Rickettsial Infections. Outbreaks of louse-borne typhus recur almost annually, but are seldom extensive, except under abnormal conditions, as during war periods. The infection is frequently introduced by

THE INFECTION IS FREQUENTLY INTRODUCED BY means of the pilgrimage traffic or tribal migrations from the neighboring territories, and is believed to smolder continuously in the northeastern mountain districts. Cases are usually observed during the winter and the spring months, with the maximum incidence in March and April. Serious outbreaks, with a total of over 1,300 known cases, were reported in 1942-43 in conjunction with epidemics prevailing throughout the entire Middle East. The actual prevalence was probably several times the official estimates. The greatest numbers of cases were noted in Baghdad, and in Basra, Mosul, Diyala and Sulaimaniya *liwas*, along the main routes from Iran. The congestion and the shortage of food, clothing, soaps and other supplies existing in that area as the result of military operations during World War II favored the spread of the infection among the louse-infested populations. About 800 cases of typhus were reported in 1944, but the annual incidence subsequently declined to a low of 72 cases in 1949. No differentiation is made as to type, and the recorded cases include both louse-borne and flea-borne infections. On the basis of laboratory investigations, authorities at the Royal Hospital in Baghdad suggest that many outbreaks in the north, where louse-borne typhus is supposedly endemic, are caused by strains which are serologically intermediate between *Rickettsia prowazeki* and *R. mooseri*. [136]

Murine typhus is endemic, and probably predominates in the rural areas in the absence of a large-scale epidemic. Tick-borne infections are not specifically reported, and are undoubtedly rare. In the event of a typhus outbreak, control measures, including the use of DDT preparations and mass immunization of the inhabitants with antityphus vaccines, are carried on in the affected communities by the government health authorities.

Plague. Epidemics of plague were frequent in the past, particularly in the region around Baghdad, but the disease has been almost completely absent within recent YEARS.

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63:Simmons et al G-5 (1941-1951) 1954
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000 years. The infection is believed to be en-
164 zootic among the field rodents in sections
133 of the eastern and the southern provinces,
505 since outbreaks have sometimes coincided with floods which caused the rats to seek shelter in the villages. It has also been introduced on occasion by way of steamer traffic through Basra and the river towns.

164 With the exception of 34 cases, associated with a localized outbreak in the vicinity of Amarah in 1945, no instance of human plague was reported from 1937 through 1952. The 1945 outbreak started in a small village on the edge of the marshes near Amarah, in which 16 cases and 4 deaths were recorded within a period of 20 days.

164 Quarantine measures were enforced by the
744 government health organization and the Allied military authorities. DDT spraying was resisted by the inhabitants, who fled to the marshes, and the most seriously infected village was finally evacuated and burned to the ground.

In Baghdad and Basra, captured rats are often examined for the presence of plague, but rodent control is not attempted in the various cities and towns unless an epidemic is threatened. Plague-infected rats were found in Baghdad up to 1938.

164 Relapsing Fever. Both louse-borne and tick-borne relapsing fever are sporadic: from 25 to 100 cases are usually reported each year. Small localized outbreaks of louse-borne relapsing fever occur from time to time, primarily in the northern provinces. More extensive outbreaks were recorded in 1945-47, undoubtedly part of the epidemic wave which swept through the eastern Mediterranean countries in 1942-46. According to official statistics, 243 cases were treated in government institutions in 1945, 334 in 1946 and 379 in 1947, in contrast with 52 cases in 1944 and 26 to 33 in 1948-49.

Occasional cases of tick-borne relapsing fever are encountered in northern Iraq.
[136] *Ornithodorus tholozani* is regarded as the probable vector.

164 Leishmaniasis. Cutaneous leishmaniasis
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p. 46 (A)

63:Simmons et al G-5 (1941-1951) 1954
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SUMMARY

Iraq encompasses the valleys of the Tigris and the Euphrates rivers, and is associated historically with Mesopotamia, the home of one of the oldest civilizations on record. It has been an independent sovereign state since 1932. The population, which was estimated at 4,799,500 in 1947, is 95 per cent Moslem and predominantly Arab. Extensive petroleum resources and date cultivation contribute to the wealth of the country, which is still relatively underdeveloped in other respects. The public health activities of the Iraqi government are centralized in the Ministry of Health, with headquarters in Baghdad. The Ministry is responsible for the maintenance of preventive and curative services, which are carried out in the provinces through subordinate provincial organizations. Municipal departments exist in Baghdad and the principal cities, but in other areas the enforcement of sanitary regulations devolves upon the government officers. In 1950, there were 82 civilian hospitals in the country, with an aggregate capacity of 4,901 beds, or slightly more than 1 bed per 1,000 population. Almost one half of the total beds were located in the Baghdad area. Approximately 82 per cent of the hospitals are supported by the government. Also in 1950, 433 dispensaries were functioning in various parts of the provinces, 403 under the jurisdiction of the government health authorities.

The water supplies in the towns and the villages of the alluvial plain are derived from rivers, canals, lakes and wells; in the northern highlands, from streams, springs and wells. All the urban supplies are obtained from rivers, except in Erbil and Sulaimaniya, where spring sources are utilized. The water supplies of the larger cities are treated, but those in the rural areas are unprotected and often polluted. There are no sewerage systems. In the cities, cesspits and septic tanks are employed for the disposal of sewage; in the rural villages, the means are more primitive. The dietary

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